

## **AUTOMATED METHODS FOR SIMULATING A BIOLOGICAL NETWORK**

### **ABSTRACT OF THE INVENTION**

The present invention relates to methods, computer systems, and computer programs for simulating a biological network. The methods of the present invention facilitate biological network simulations via automated equation generation based on the concept of a hierarchy of canonical forms that describe biological processes at various levels of detail. At each level of hierarchy two classes of canonical forms can be identified: the input canonical form, that is used to supply information to the program, and the output canonical form that is produced by a simulator. The methods in certain preferred embodiments include explicit output description and flexible user intervention at several steps through the model generation. Furthermore, preferred embodiments of the present invention provide the modeling of developmental networks using an organism-as-a-graph approach using domains and fields.